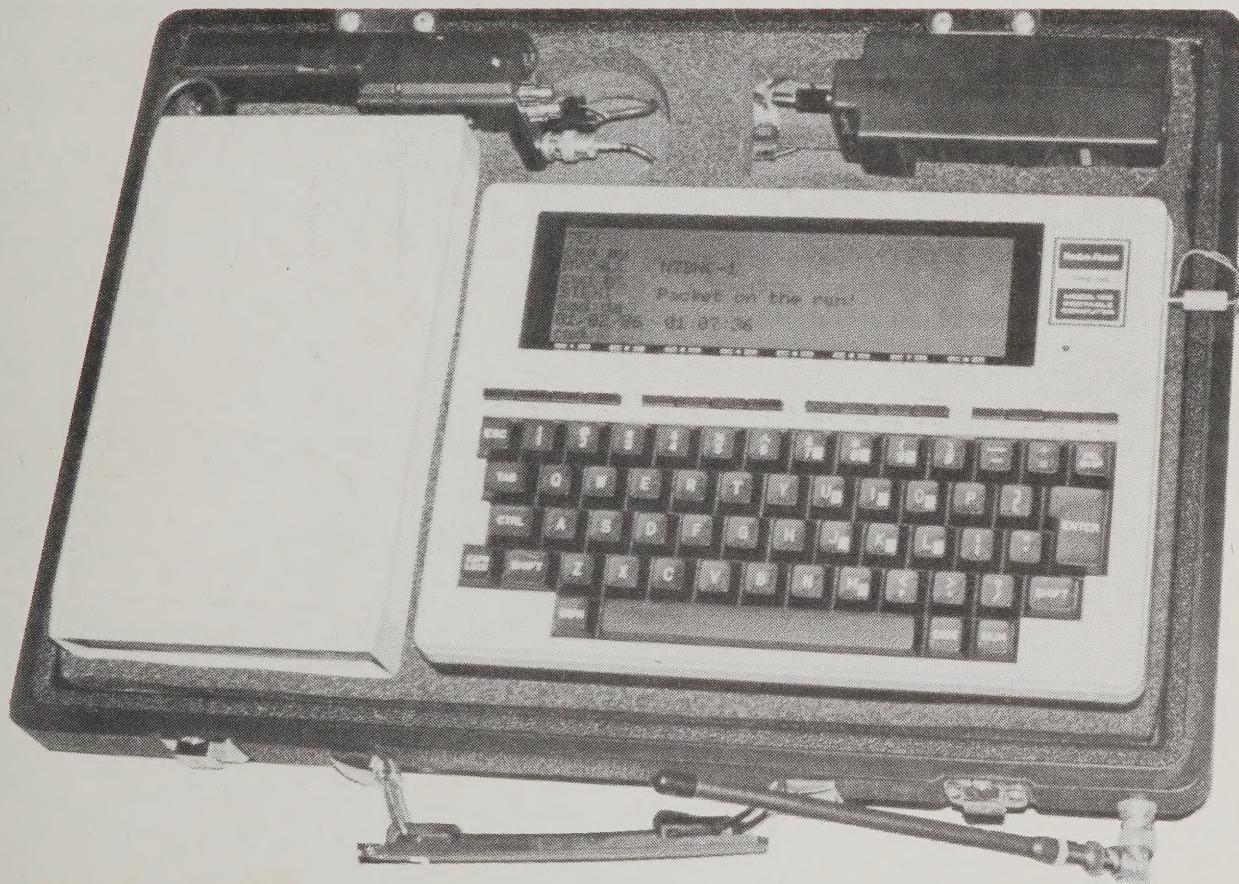


Vol. 1 No. 1
January 1986

PRM
PRM
PRM

PACKET RADIO MAGAZINE

Dedicated to the Advancement of Packet Radio



PACKET ON THE RUN!!

FADCA Inc.
812 Childers Loop
Brandon, FL 33511



BULK
RATE
U.S. POSTAGE
PAID
PERMIT #111
BRANDON, FL

Sponsored by F.A.D.C.A.

TAPR TNC-2 IS NOW **Pac-Comm** TNC-200

- Official TAPR TNC-2 design
- Top quality components throughout
- Standard AX.25 Version 2 protocol
- Full duplex hardware HDLC
- Five terminal data rates to 9600 baud
- Modem adaptable for HF packet
- 16K battery backed-up RAM
- 32K EPROM, software clock
- Latest multiconnect software
- Five labeled LED status indicators
- Level 3 networking compatibility
- Choose CMOS version for low power (100ma typical) or NMOS for lower cost

Macintosh Owners: MACPACKET / TNC200 gives pull-down menus, split screens, file transfers, automatic routing and more !!
MACPACKET/TNC200 \$69.95



Free UPS shipping in continental USA

Assembled and tested	CMOS - \$ 219.95 NMOS - \$ 199.95
Full kit with cabinet	CMOS - \$ 169.95 NMOS - \$ 154.95
Full kit without cabinet	CMOS - \$ 144.95 NMOS - \$ 129.95
Hard-to-find-parts kit with PC board + Assy Man	CMOS - \$ 84.95 NMOS - \$ 79.95
Bare PC board + assy manual	\$ 39.95
Reference manual (100 + pg)	\$ 9.95
Cabinet with end plates	\$ 29.95

Discount 10 % for orders of five or more TNC-200s to the same address

ORDER TOLL FREE 800-835-2246 ext. 115 VISA / MASTERCARD

(In Kansas 800-362-2421 ext. 115) (Sorry, No COD)

Intl TELEX (via WUI) 6502881526

Information 813-689-3523

Florida addresses add 5%

PAC-COMM PACKET RADIO SYSTEMS, INC.
4040 W. Kennedy Blvd, Tampa, FL 33609

PACKET RADIO MAGAZINE

Brandon, Florida

PACKET RADIO MAGAZINE is published monthly by the Florida Amateur Digital Communications Association, Inc. (FADCA), 812 Childers Loop, Brandon, FL 33511.
Editor - Gwyn Reedy, W1BEL
Layout Editor - Brad Voss, WB8ZPE

Subscriptions to PACKET RADIO MAGAZINE are handled by participating clubs. Check the newsletter section for a club in your area, or contact FADCA for individual membership.

News and Views

Gwyn Reedy, W1BEL

Welcome to PACKET RADIO MAGAZINE or PRM for short. This is the first issue and I hope everyone will like the new format. This is the beginning of the third year of publishing for FADCA, and PRM will continue and expand on the fine reputation earned by the FADCA > BEACON.

Why did we change from the newsletter format that was so popular? Well, packet radio is changing every day, and I think this publication should grow with it. Back in 1983, packeteers in Florida were few and very isolated. The FADCA > BEACON served to unite them through shared information. Now our network provides ready electronic communication and local groups are active everywhere. The need to share information is now among states and regions. I get newsletters from all parts of the country and find many useful thoughts and ideas in them. I also find tremendous duplication. The combined newsletter/magazine format of PRM will take allow shared information without duplication for those groups that participate.

What is the relationship between FADCA and participating organizations? FADCA is providing a service to all groups that wish to participate. PRM is the way to have a good quality publication at less cost and effort than would be required for a local publication. Local editors can concentrate on quality rather than quantity in their newsletter efforts. Everyone benefits from the creative energy of a much larger group of writers and the wide geographic area covered. FADCA benefits by the economies of scale in printing brought about by the increased circulation. Advertisers benefit by a larger audience, etc. As editor, I benefit by having local contributors doing the work of preparing their contribution, and the

larger circulation permits improvement of production techniques (color, photos, etc.) not previously possible with the limited FADCA budget. This is an arrangement full of benefits for everyone.

How do you participate? If you are a FADCA member or member of another participating group, you will receive PRM as a membership benefit. FADCA members during 1985 who also belong to a participating group should not renew for 1986. Persons not receiving PRM through their organization may join FADCA and receive an individual subscription.

The financial and administrative arrangements with other organizations are as follows: A club official applies to FADCA to participate in PRM. The editor or other designated person contributes written material by each month's deadline, and provides a run of mailing labels for those persons who are to receive the coming month's issue. FADCA prints and mails the PRM directly to each person, and bills the participating organizations for the number of issues sent based on the costs of producing that month's issue. The number of issues sent is thus under the control of the local organization. Costs are not predictable in advance because the number of participants, advertisers, and production costs may vary. FADCA has guaranteed that the cost per subscription per year will not exceed ten dollars, and it is expected to run about 75 cents per month.

Articles and photographs are solicited. If you have constructed, modified, or dreamed up something you are proud of....write it up, photograph it, and send it to the FADCA address. I look forward to hearing from many of you.

A Briefcase Station

Dave Pedersen, N7BHC

Has the thought of a readily portable Packet station crossed your mind? If it has, read on, and see what my approach was. This is not by any means a "go thou and do likewise" treatise, but rather one person's solution to a need.

Let me begin with a basic system description. The computer is a Radio Shack Model 100, the TNC is a TAPR 2, the radio a Santeec HT, a cheap battery pack, all housed within the confines of the Radio Shack briefcase that is designed for the Model 100.

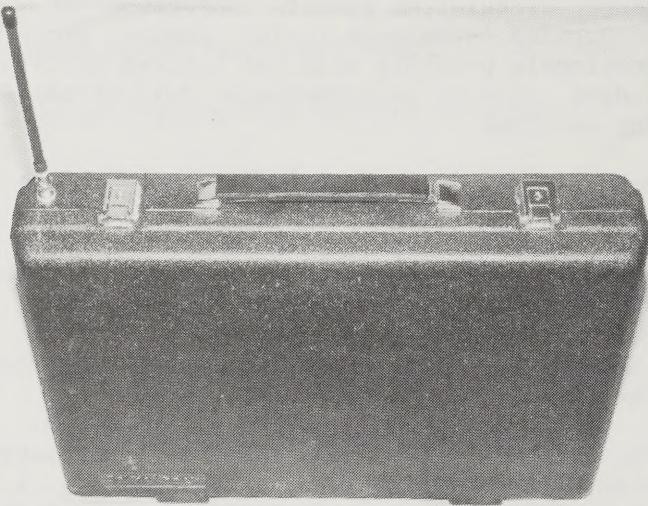


FIGURE 1

The first briefcase station in Salt Lake was built by Steve Peterson KI7L. Steve's station fell short of my main criteria, namely that of being totally self-contained in one unit. However, he had come across one feature of the Tandy case that had escaped my attention; the TNC-2 was an almost perfect fit in the cutout meant for the cassette recorder. After seeing Steve's system, my design was pretty much finalized in my mind.

One important decision that I came to was to use pretty much what I had on hand in the line of equipment wherever possible, rather than buying the ideal equipment. Now I must admit, I HAD bought the Model 100 when they went on sale for \$399 for this exact purpose, and the TNC-2 HAD to be bought for the same reason. But these pieces of the station were bought because I knew that someday I would be able to build a truly portable station. Since about April, I had been using a TAPR TNC-1 and a Drake TR-22 in a big green box that measured about two

cubic feet in volume, and had already acknowledged the need for something better. In mid August, I even took my big green box station with me on vacation to Massachusetts. It took up a small suitcase! I think if I had been a ham back in the thirties, I would have been the type to dedicate the better part of the car to a mobile station. Halfway through the vacation, the TAPR TNC-2 went on sale. I had been aware of this event for quite some already, and literally spent 7 hours on the phone during my first vacation at the sea in eight years to get one of the little darlings. Clearly this spelled the end of my big green box station. It now is used in the home station, along with several other TNCs.

Anyway, enough of the history. Let's get down to the meat of the system. Figure 1 shows what the finished product looks like, all sealed up. I especially like the rubber duckie bouncing around on the front of the case. I have yet to try and get it through the security system at Salt Lake International Airport. Incidentally, the whole shebang weighs 12 pounds.

Figure two shows the inside of the system, with all the pieces in their appropriate places. This picture is truly worth a kiloword. The briefcase, which is made of a very resilient plastic, has a thin layer of foam on the very bottom, and all the way around the edges. The lid also has a similar layer of foam. In the bottom case piece, there are two layers of foam above the first thin layer. The first thick layer (the middle layer) is about 7/8 inch.

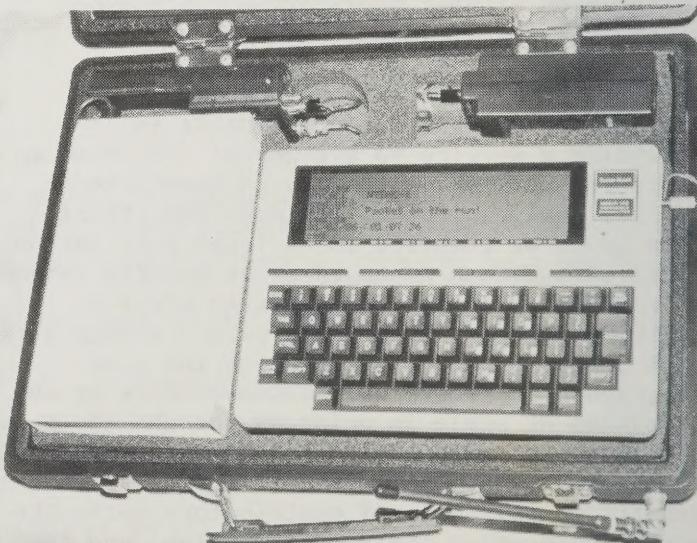


FIGURE 2

thick. The top layer is approximately 3/4 inch thick. Both of these pieces have cutouts in the foam. The top piece has a large cutout in the front right side of the case, where the Model 100 computer rests. On the front left side is a smaller cutout for the cassette recorder. This becomes the resting place for the TNC-2.

Beneath both of these units, in the middle piece of foam, are more cutouts. I recommend that you use this area as a storage place for accessories for the station, e.g. the TNC-2 manual. Just cut out a piece of foam large enough for the manual beneath the computer, and you won't have to remember all the commands.

Another approach to placing the TNC, that used by Steve KI7L, is to cut out the middle layer of foam beneath the cutout for the cassette recorder, and set the TNC all the way down in the case, and rest the TNC manual on the top of the TNC. With the lid closed, just enough pressure will be exerted against the manual to keep it from sliding around.

My approach was to leave the middle piece of foam intact. This led to another problem; when carrying the case by the handle, gravity had a nasty tendency to pull the TNC downwards, and into the radio. Having paid good money for the radio, I was not wholly enthused with the idea of the plastic radio case supporting the TNC in its heavy metal box. Obviously, a gravity-negating device was called for. This wonderful item is illustrated in figure 4. It consists of an L-bracket, made out of 3/4 x 3/4 inch angle metal, approximately 5 inches long. This is attached to the two rails on the bottom of the TNC-2 with a couple of screws. The screws, which have large, flat heads, are mounted with the heads inside the rails, and the threaded shank sticking down below the TNC. The plate is attached with nuts and lock washers. This approach was chosen so as to keep the TNC-2 in a pristine and more easily resaleable condition.

The radio is a Santecl LS-202A all-mode HT. This was used in place of the desired Kenwood TH-21A sub-miniture radio for a couple of reasons. First, I already had the Santecl, and second, it would cost about \$200 to get the TH-21A. If I started designing with a clear slate, I would probably use the minuscule Kenwood just for the size factor...the smaller they are, the easier it is to find a place for them. You will notice that there is very little clearance between the radio and TNC, which is one of the main reasons for the bracket on the TNC. The radio is left on 145.01 MHz, in the low power 500mW setting. The decision to leave the system at a 1/2 watt stems from the both a power consumption consideration, and the fact that the power level switch is on the other side of the radio.

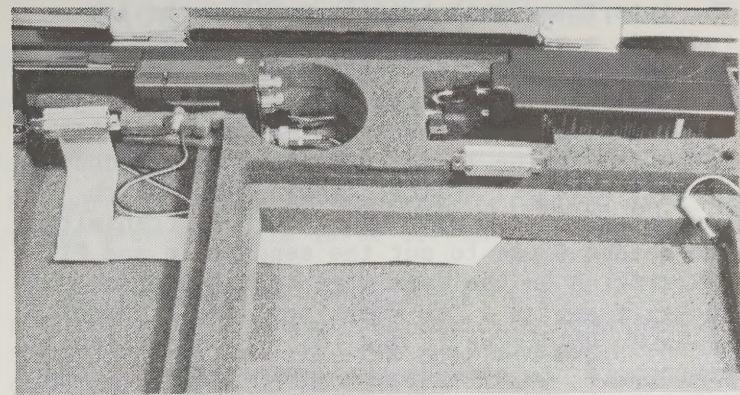


FIGURE 3

A half watt seems to do a very commendable job. More on the interface between the TNC and radio later in the wiring section.

The battery pack is a 12 volt, 1.2 Ah NiCad pack consisting of 'C' cells. It was originally meant for a portable TV camera, but several of them came into my ownership for 25 cents apiece. Thus for a dollar, I have four interchangeable packs. I merely unplug a pack when it gets discharged, and replace it with a fresh one. A feature which I plan to add soon is an external power jack, which will enable me to run off an external 12 volts DC source.

The actual construction of the system can be divided into two distinct tasks; cutting up the foam with an Exacto knife, and wiring harnesses to tie everything together.

Lets look at the cutting phase first. I used an exacto knife, and went through about ten blades...use sharp blades, as it will make the job a lot easier, and will make for much more precise cutting. You will need to cut out an area for the radio and battery pack. The exact shape and size will depend on what equipment you decide to use. The foam will also need to be cut slightly between the different compartments in the case to feed cables through.

Now for the wiring. To get a pictorial overview of the finished cabling, refer to figure 3. This is what the system looks like with the TNC and computer removed. All cables run between the bottom thin layer of foam and the middle thick layer. The interface cable between the computer and the TNC-2 is a 25 wire ribbon cable, using insulation displacement connectors. I believe that for the average assembler, solder connectors would be quite a bit easier. Note that all 25 lines are not needed, and I recommend that only lines 1,2,3,4,5,6,7 & 20 be used, as they are all that are needed. Besides, they are the only ones connected in the Model 100 anyway.

The interface cable between the TNC and the radio is a pair of lines, sharing a common shield. Only two lines are needed as the Santecl uses a 'leaky mike' line to implement PTT, just like the Icom 2AT. The technique used in this method of keying is to interrupt the microphone circuit with PTT switch; closing the switch completes the circuit, and the radio transmits. The method I use to put the send audio and PTT information on the same wire came out of a packet magazine a few years ago, and I cannot remember which one it was. Only two additional components are needed, a 4.7Kohm resistor, and a 0.1uF 50volt capacitor. In my station, both

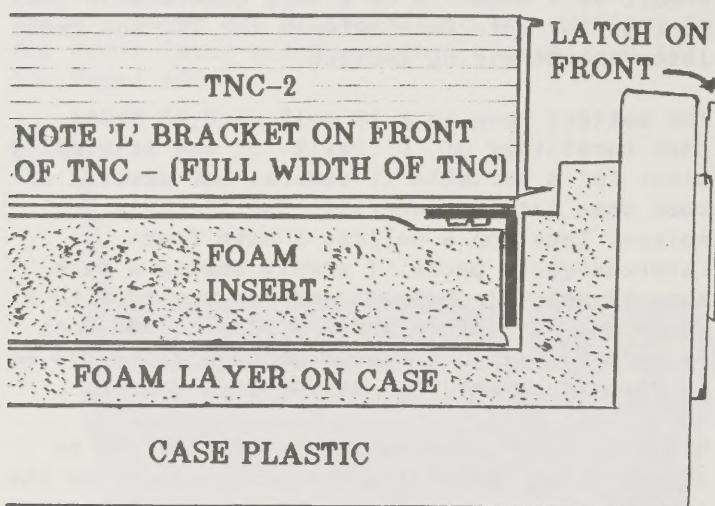


FIGURE 4

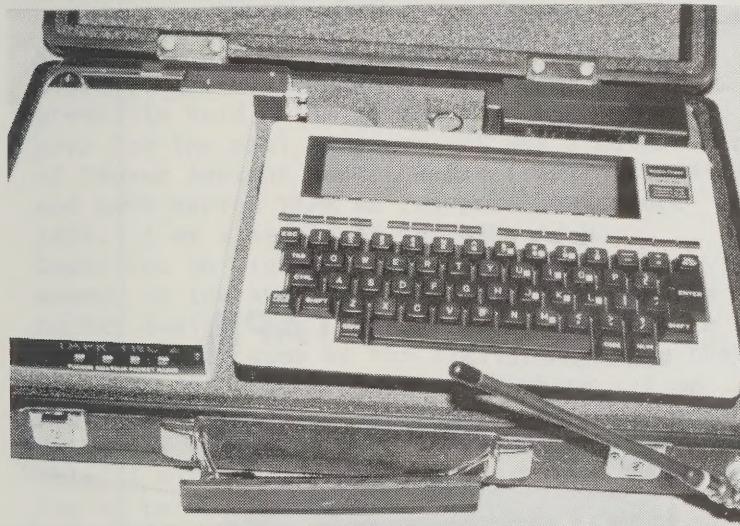
of these components are mounted within the hood of the 5 pin DIN connector on the back of the TNC. One end of the capacitor is connected to the send audio pin in the connector, and the other end goes off to the microphone connector of the radio. In other words, the capacitor is in series with the audio coming from the TNC, and serves as a DC blocking capacitor. The capacitor may just as easily be placed on the TNC PC board itself, at the point between the modulator output and the connector. The resistor is placed between the PTT pin on the 5 pin DIN connector, and the end of the capacitor to which the line to the radio is tied, i.e. the end away from the TNC modulator. The receive audio from the speaker jack on the HT is treated in the normal manner.

A warning here. On some small radios, the speaker and mic connector grounds are not at the same potential, and connecting both may make the radio permanently lock on transmit, or some other strange symptom may appear. The simple fix is to determine which of the connectors has true ground on it, and use only that ground. Leave the other connectors shield floating.

DC power wiring. This was an interesting challenge for a few minutes, as a couple of options were available. The basic decision was whether to provide a separate 5 volt regulator for the Model 100 computer, or to use the one already contained within the TNC-2. A third option was to use internal cells for the Model 100, and not worry about a power source for it. This approach was rejected because I did not want to worry about two different battery packs going flat. Therefore a regulator was needed to drop the 12 volts of the whole system down to 5 volts that the Model 100 needed. The external regulator approach was chosen, once again in the interests of keeping the TNC-2 in a clean condition, and also that of possibly ending up with some non-standard connectors. Murphy's law guaranteed that a standard connector would be plugged into the non-standard one in very short order, burning something up (probably the most expensive item). You may be able to notice a tiny piece of perf-board between the battery and radio. This is my power bus. I connect to the battery via a small coaxial power connector, which doubles as the main power switch. All the equipment power switches are hard to get to, so this is a useful feature. You don't want to forget something on while the station is not being used, as this will unnecessarily waste power.. Anyway, the 12 volts comes from the battery to the power bus. From here, the 12 volts branches out to the radio, the TNC, and the 5 volt regulator (7805), from whence it goes to the computer. The radio is hard wired (soldered) to its 12 volt line. The TNC has a short-barrel coaxial power connector for its connection to the power source. The line to the TNC does not come off the connector through the usual plastic cover, but rather leads away from the connector at right angles, i.e. straight down and under the foam. A bit of 5 minute epoxy keeps the connection secure. The 5 volt line to the computer pops out from under the foam very close to the power socket on the right hand side of the computer. This connector must be unplugged whenever the case lid is closed, as the connector protrudes quite a way out of the computer. In the interests of keeping everything secure when in transit, a small hole was bored into the foam just behind the computer, between the battery and computer. I just push the 5 volt connector into this hole while the system is in transit.

Note that all lines, the RS232 line, DC wiring, TNC-radio interface, and antenna lead are all between the bottom thin layer of foam and the middle, thick layer. The antenna lead is a piece of RG-174 coaxial cable, which has a diameter of 1/8 inch. This is attached to a

male connector at the radio end, and a female solder connector at the briefcase end. Installing the connector on the top cover of the briefcase, just ahead of one of the latches, turned out to be quite a task. A hole must be drilled from the outside to pass the shank but not the body of the connector. The hole through the inner wall must be large enough to accomodate the nut for the connector (my connector has a single nut mount). Now pass the cable through the nut on the inside of the case, and through the case from the inside toward the outside. Solder the female connector to the cable, and carefully feed the cable back into the case until the connector is snug against the case. Now put the nut on. Good luck. I had to have a friend reach in and hold the nut in place while I rotated the connector. I had to also rotate the cable, as it is somewhat delicate and can easily twist off.



Well, that's about it. I hope to see a good many more portable stations around soon, and I hope the explanation of my station has been of some assistance to you in planning your station. A few last thoughts...

The GLB PK1L looks attractive for such a station because of its low power consumption. Check out a TNC kit without a big case...a small case may do the job, leaving you with more room to spare.

Consider one of the newer portable computers, such as the small Heath/Zenith unit, which looks quite promising for this application.

73, and watch for my 'Packet on the Run' beacon.

Model 100 / TNC-2 Clock – A Timely Program

Dave Pedersen, N7BHC

I recently finished assembly of my "Briefcase Portable" station, which is described in the cover story of this issue of PRM.

In the interests of battery life (I only have a 1.2Ah pack), I shut the entire system down when it is not in use. The only detrimental aspect of doing so is that the clock in the TNC has to be reset on power-up.

As any Model 100 user knows, the little computer has a very good real-time clock of its own. Being somewhat lazy, I latched onto the idea of using the Model 100 clock to set the TNC-2 clock when it was mentioned to me by Steve Baxter, KA7JXR. The program which I wrote to accomplish this was written with total disregard to programming effeciency, with each statement essentially on a seperate line merely for clarity. No fancy features have been added, as the program is less than two days old, and I have not yet had time to add such niceties as automatically going into the Telcom mode.

Once written, save the program to memory, and run it anytime you wish to set the clock.

```

100 OPEN "COM:77I1E" FOR OUTPUT AS 1
110 B$ = DATE$
120 C$ = LEFT$(B$,2)
130 D$ = MID$(B$,4,2)
140 E$ = RIGHT$(B$,2)
150 F$ = TIME$
160 G$ = LEFT$(F$,2)
170 H$ = MID$(F$,4,2)
180 K$ = E$+C$+D$+G$+H$
190 PRINT #1,"DA ";K$;CHR$(13)
200 CLS
210 PRINT K$
220 BEEP
230 PRINT "TIME NOW SET : GO TO TELCOM"
240 END

```

A few notes on the program:

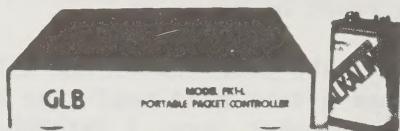
The numbers in line 100 set the serial port parameters. Be sure that they are the same as you normally use. Lines 200 to 230 may be readily deleted to save memory. The lines used for generating strings can probably be done a lot more effeciently, and probably in a lot less space.

Please feedback any fancy embellishments that you make.

PACKET RADIO GOES PORTABLE

GLB ELECTRONICS

presents



Model PK1-L

- LOW 25 mA Current drain.
- Designed for portable or solar-powered stations.
- Miniature size—Lightweight
- Rugged all metal, shielded enclosure.
- On-board Lithium Battery RAM backup.
- On-board watchdog for reliability.
- Standard DB-25 Connectors.
- Output signal indicates "Connected" Status.
- Does not require squelched audio.
- Comes with 8K of RAM.
- Remote Command Mode for Unattended operation.
- Hardware command lockout for security.
- Commands compatible with our Model PK1.
- Retains all other features of the Model PK1.
- Extra I/O lines for special applications.

Power requirement:

9 to 15 Volts DC @ 25 mA typical

Dimensions:

4.6 X 5.90 X 1.0 inches

Total Weight:

12 ozs.

PK1L—Wired and Tested

List—	\$239.95
Amateur net—	\$209.95

GLB MODEL TNC-2A KIT

Just when you thought TAPR TNC-2 Kits were a thing of the past, GLB — the first commercial producer of Packet Controllers — Joins the "TAPR Revolution" at last!

Hardware
Software
Documentation

by TAPR



GLB Model TNC-2A Kit

COMPLETE KIT ONLY

\$154.95 NMOS

\$169.95 CMOS

+ shipping

Contact GLB for information on our full line
of Packet Controllers



GLB ELECTRONICS, INC.

151 Commerce Pkwy.,
Buffalo, NY 14224
716-675-6740 9 to 4

Cactus Corner

de WA7GXD

Welcome to the official launch of Packet Radio Magazine! The Florida group has certainly done a tremendous job with the FADCA>BEACON, and PRM is a logical outgrowth. As it picks up more and more club newsletter chores, it should blossom into a very significant publication on the Amateur packet radio scene in the United States. I wish to join the chorus in wishing Gwyn Reedy, W1BEL, Editor of PRM, the best of luck in this new effort.

And I wish to thank him for the opportunity to write a column for PRM.

Many of you reading this column may be wondering who WA7GXD is, so I will open with a brief introduction.

My name is Lyle Johnson, and I have been a licensed Amateur since the age of 13. I presently hold an advanced class ticket, and have for the past 18 years. I was a co-founder of Tucson Amateur Packet Radio (TAPR) in 1981, and have served TAPR as its president since 1983. I am a member of the ARRL Ad Hoc Committee on Digital Communications, a life member of the ARRL and AMSAT, a member of the PACSAT design team, and have been involved in the design of some of the digital hardware that is often found in a packeteer's shack. I am also married (right at 15 years now) and the father of six children. By the time you read this, I will be at least 36 years old. So much for my background.

TAPR is one of the older Amateur packet organizations. Started in 1981 as a local group, it quickly grew into regional scope. By late 1982 it had become a national organization, and has since had some degree of impact on Amateur packet radio development on the international level. TAPR is not an "operational" group, like FADCA or CAPRA or RMPRA, but a development group unique in Amateur radio history.

Speaking of development, you may be wondering what TAPR has up its collective sleeve now that it is no longer active in the TNC kit business.

The main project currently active is the Network Node Controller (NNC), a device somewhat akin to a super TNC. It has four (4) radio ports, unlike a TNC which has only one. It also has a pair of RS232C-compatible serial ports for a terminal and ???, again unlike a TNC which has only one. It includes a parallel printer port (to drive a "Centronics"

compatible printer), up to 512k bytes of memory (most TNCs have under 64k bytes), and a very fast Small Computer System Interface (SCSI) bus.

The intent of the NNC is to provide a standardized hardware system upon which to develop software to accomplish networking. The NNC is designed to be a rugged, reliable device capable of operating for long periods of time at remote sites. This is unlike typical computer hardware (such as a Xerox 820 board or a PCclone) that would probably be unsuitable for extended unattended operation in harsh environments.

There are other projects afoot, including an inexpensive HF tuning indicator that should work with any TNC that uses a properly aligned XR2206/XR2211 modem (all TAPR TNCs and clones as well as the GLB PK-1 series).

Perhaps the "hottest" device of them all is the soon-to-be-unveiled TAPR LSC-10 Universal Packet Accessory. This device is so well suited for Amateur digital communications that it is even useable for AMTOR and RTTY operation -- but probably not CW when using a keyer. Following in the spirit of the RMPRA's ALJ-1000 accessory for the TNC 2 kit, the LSC-10 will be inexpensive, practical and intuitive in operation.

The LSC-10 is scheduled for introduction at the TAPR Annual Meeting to be held in Tucson on February 8th, by Pete Eaton, WB9FLW, TAPR VP. I would tell more about it, but I am out of space for this issue! I will try to explain it more thoroughly next time.

Please write to me c/o TAPR, PO Box 22888, Tucson AZ 85734-2888 if there are any subjects you would like me to address in this column. Mark the envelope and the letter "PRM" so I will know you are writing in reference to this column.

Next month, the TAPR Board of Directors will meet to elect new officers and set the general tone of the organization for the coming year. I hope to report on salient details of that meeting in next month's column. Until then, happy packeting!

The correct mailing address for Central Iowa Technical Society is:

CENTRAL IOWA TECHNICAL SOCIETY
c/o RICHARD E. AMUNDSON WAOJFS
4621 SW 2nd ST
DES MOINES, IA 50315.

SAREX-II Test Flight

Ted Huf, K4NTA

In March 1986, WA4SIR will be aboard the Space Shuttle. It is hoped that there will also be enough room for the Shuttle Amateur Radio Experiment II. On this flight of the Shuttle, there is to be a TAPR TNC-2 and the same Motorola radio that was used by Dr. Owen Garrett, W5LFL. The TNC will have special software written by Howard Goldstein, N2WX. The software will have a robot mode that will allow as many as 9 connections at once with the Shuttle. When in the robot mode, the a connection with the shuttle will cause the robot TNC to send you a serial number in hexdecimal and a short message. It will then send a disconnect request. This serial number is your confirmation of the connection.

The SAREX-II TNC will also send a worked beacon that will list the calls and serial numbers of the stations worked and a heard beacon listing the calls of all station heard and worked. There will be provisions for a META beacon that can be programmed by WA4SIR in the shuttle with any message that is wished from the on board model 100 computer. It is also possible for it to be used as a digipeater.

While Howie, N2WX, had tested the software on the ground, it is hard to get the large numbers of connect attempts needed to simulate the actual shuttle flight. When Henry Felton, WA4HXZ, heard that Howie would like to fly the TNC around a little bit, he stepped forward right away with an offer to pilot the test flight.

After a request to Tom Kneisel, K4GFG, who works at Motorola in Plantation, we had the loan of a Motorola MX radio just like the one that will be used on the Shuttle. Howie sent me a disk with the actual program that is in the shuttle TNC and I programmed the 27C256 from my TNC-2 for Henry to use in his.

On Saturday night, December 21, 1985, Henry and co-pilot Tony, HK3QB/W4, took off from Palm Beach International in the Civil Air Patrol plane (both Henry and Tony are CAP members) at about 1930 EST. N4FJL made the first connection with the robot TNC. They did not have a terminal onboard but were in contact with the ground on 147.51 simplex. The flight plan took them South to Pompano where they turned NNW towards Clewiston. As soon as they were off the ground, stations in South Florida started making connections and digipeating thru WA4HXZ. I saw digipeated connections between stations on the lower East coast to stations in the Tampa area.



Tony, HK3QB and Henry, WA4HXZ

The flight plan took them around the West side of Lake Okeechobee. Head winds caused greater fuel use than was planned so they put down at Lakeland to refuel. When on the ground it was discovered that the fixed base operation was closed. They then went Tampa for fuel. This delay caused some concern on the East coast because we did not where they were. It was about this time that the battery on the HT used for voice went dead and the spare radio had some trouble. A long distance phone call to Manny, W4SS, who helped with communications on 147.51 informed us that they were in Tampa and would be taking off soon.

The flight back was across the state and South to West Palm Beach on the East side of the big lake. On the return flight many of the participants had gone to bed but many more contacts were made until they landed sometime after midnight.

In total there were 899 contact serial numbers generated by the robot TNC. Some using Kantronics TNCs found that they either could not copy the airplane or could not until they turned the EQU command off. Another station reported that he could not copy the plane until he switched to a different TNC. It was suggested that the Motorola MX might have a little different transmit roll-off than we are used to with Ham rigs. I understand the the actual radio and TNC to be used in the real shuttle mission are in bonded storage and can not be modified so we will just have to adjust our operations on the ground.

The Peripatetic Packeteer

Steve Peterson, KI7L

If all goes as planned, Ron, WA4SIR, will be operating a packet radio station from the Space Shuttle in March (mission 61-F). As a ham-radio-in space fan as well as a packeteer, I am looking forward to having another chance to work the space shuttle. I thought it might be appropriate to pass along what I have learned about Earth to Shuttle operation so that you might have a better chance to complete a packet contact.

As of this moment, late 1985, and according to the W3IWI BBS, it appears that the packet software will support the following modes: the machine connects, assigns a QSO number, and the disconnects; Worked Beacon, where your call will appear on the worked list; Heard Beacon, where the most recently heard calls will be listed; Normal Beacon, where information packets will be sent; and finally, a Meta Beacon, which will contain information on the mission status.

As with all ham in space activities, you should be on the lookout for last-minute changes. One place to keep informed of mission status is the 75 meter AMSAT net which meets on or about 3857 KHz on Wednesday at 0200 UTC for the East Coast net, 0300 UTC for mid-America, and 0400 UTC for the West Coast. Check-ins are welcome and last minute mission information is generally available.

The shuttle "flies" at a relatively low altitude, about 200 miles, and in order to stay up there it must move fast. Eight or nine minutes is about tops for the length of a single pass, so you need to know where and when to look for the shuttle. AMSAT and NASA distribute what are known as Keplerian element sets which contain orbital information used by a computer program to calculate shuttle pass times and direction. You should either purchase a tracking program from AMSAT Software Exchange, Box 27, Washington, DC 20044, or befriend a ham who has strange looking antennas that are often seen pointing up into an apparently empty sky. AMSAT can supply a list of local "area coordinators" whose function is to help the budding satellite operator get started. In fact, if you join AMSAT, you will be given free a copy of "A Beginner's Guide to Oscar-10" which contains valuable information about assembling a satellite station. Yet another source of information is "The Satellite Experimenter's Handbook", published by the ARRL.

Once you know when and where the Shuttle will be, you need to get a signal up to it and one in return to exchange a packet. Ground-plane antennas don't radiate straight up, or at least they shouldn't, but it might be possible to make a contact using one when the shuttle is near the horizon. As the shuttle disappears over the horizon, it will be some 1200 miles away, so that a gain antenna or considerable power into the ground plane will be required for a contact. I have regularly worked satellites 2500 miles away using about 100 watts ERP (effective radiated power), and I have also keyed overhead satellites with an HT and a rubber duckie. If you have a gain antenna with azimuth rotation capability, then horizon passes may offer your best opportunity for a contact. I received full quieting slow-scan signals from STS 51-F using a hand held connected to a home brew 3 element delta-loop yagi, also hand held and pointed at the shuttle by monitoring its audio downlink.

There are also some other factors that need to be considered when trying to work the shuttle. Because the shuttle is moving so fast, there is a significant doppler shifting of the downlink frequency. This may or may not be a problem depending on the capture effect of FM communications equipment and the received signal strength. Still another characteristic of space to ground communications is polarization shift. On the recent DPOSL shuttle flight, I noticed minute by minute changes between right hand circular and left hand circular polarization. On the STS 51-F flight, downlink signals could be improved by rotating the yagi on its axis (i.e. changing from vertical to horizontal and in between).

One final caveat; signal strength will be dependant on the attitude of the spacecraft. If the antenna is the same as that used by W5LFL in Columbia two years ago, the shuttle must be in a more or less upside down (for us) position for best communication to Earth. Experiments on board will dictate the required attitude for the shuttle, which may not be optimum for downlink to Earth. Keep trying to make contact for as many passes as possible. In this business, perserverence pays off.

(Steve is AMSAT area coordinator for Utah, and made a two-way contact with W5LFL aboard Columbia. He enjoys amateur radio digital and space communications. When band conditions are poor, he tries to earn a living as a bioengineer. Other interests include reducing the radar cross-section of his wife's MR-2.)

Gator-2 is Here!

Howard Goldstein, N2WX

Rumours about the lack of progress on networking are not based on fact. What is fact is the Melbourne LAN is now served by a REAL network switch. The rest of this describes the switch, and another file contains a survival sheet for using the node.

What is a network switch?

A network switch is a device which interfaces a LAN (Local Area Network) to a larger network of networks (WANs for Wide Area Networks).

Why a switch?

The protocol we use to connect - AX.25 - is not fully implemented in most TNCs. Only half of the protocol, the LINK layer as it's called, is there. For reasons of complexity the first TAPR boards didn't support the missing half, a NETWORK layer, so digipeaters were kluged on and that's the way we have been doing business on packet for the past few years.

But it is not enough. No one needs to be reminded how poorly the digipeater "fix" works for more than a few hops, and under congestion. The problem is your TNC has to work very hard guaranteeing that packets you send make it across xxx unprotected hops. It does not work well.

So the solution is to have the digipeaters Linked (i.e. connected) to each other, and to use a NETWORK layer between the digipeaters (X.75 in the case of Gator 2), thereby doing away with retries you as a user would notice. In other words, you'd "Connect" to the switch and it would forge a Virtual Circuit (another buzz word) across however many switches it takes to reach the callsign you've given. There is no limit on the number of intermediate switches, and since the digipeaters all "ack" each other there are few if any retransmissions by anyone.

This is one of the functions that gator 2, and the Melbourne switch support - Today.

Well what good does it do me?

Like I said, it does away with the problem of LUCK for multi-hop QSOs. Once your packet(s) are acknowledged by the local switch, you forget about them. The network takes care of the rest and notifies you if something went wrong.

Don't be selfish! It helps everyone else by reducing QRM immensely - it makes everything happen on a one to one basis so someone else's bad path doesn't affect yours.

Long files? From Jax to Mia? Why not? The other features gator 2/AX.25 level 3/X.75 offer are:

o - CONGESTION control - Under heavy loading, the network automatically allocates channel capacity fairly.

o - NO end-end ack's - This means the network does some buffering for you to improve the throughput of your long distance QSOs. The Jax-Mia file xfer can potentially provide almost a 1200 baud circuit.

o - MailBox support built in. If you use the pad facility at N2WX-7 to call a mailbox, the network will provide your callsign for the WORLI mailbox so it gets through.

o - The catch: Other local 820s (STU, OCF) are still running the outdated "N2WX-7 like" code until they get EPROMS.

When do I start?

How about right now? Hopefully you're already using the pad to read this - if so you're conserving channel capacity.

SAREX-II TEST FLIGHT

Continued from page 8.

Another problem seemed to be when trying to use the TNC as a digipeater. The robot was operating on 145.55 tx and 144.95 rx in full duplex but the radio does not work in full duplex because it is a transceiver. When the a frame arrived that was to be digipeated, it would transmit it right over the connect attempts and acks. This seemed to shut down normal connections when there was a lot of digipeater activity.

I found that power made a big difference too. I was running only 1.5 watts during the test and had a hard time getting in until they were very close or the channel was clearer.

All in all the test flight was a big success. Howie, N2WX learned a lot about it to pass on to the AMSAT and ARRL people and those who participated learned what they might need to do to be successful when the real mission takes place in March.

Gator 2 PAD Survival Sheet

Howard Goldstein, N2WX

1.0 The Gator 2 PAD (Packet Assembler/Disassembler) provides an alternate access method for users who do not support AX.25 level 3 in their TNCs - the PAD facility. Up to fifteen pad users are supported simultaneously on ports A through 0.

2.0 Placing calls

2.1 Activating the pad

The pad is activated by connecting to the switch and sending a packet.

```
cmd:CONNECT N2WX-7
cmd:*** CONNECTED to N2WX-7
{4
```

gator 2 pad 03100305724 port B

```
enter: call [, digi1 [, digi2 [, digi3] ] ] to?
```

-- example of activating the pad --

2.2 Specifying the destination

Now the pad needs to know who you wish to call. Enter the callsign (along with any ssid) and press.

to?N2WX-1

In some cases the station you want to connect with will not be within direct range of the switch. Gator 2 supports both networked calls and calls using digipeaters.

to?K4OZS,ORL,OCF

Above is an example of what to tell the Melbourne switch to call K4OZS who lives beyond the range of the network layer (but is available this way).

to?K4NTA @305STU

Although this example is not supported yet, it will be should STU implement gator 2.

2.3 Indications

Once you've issued a callsign (and optional @/digipeater parms) one of three things could happen.

> Normally you'll get a message like

*** pad: connection reset

This means the call was successfully completed. It is analogous to a "**** connected" message

You could get a *** pad: connection reset message if the person on the other end reconnects or somehow resets his own link.

> You get the prompt again

to?N2WX-1

```
enter: call [, digi1 [, digi2 [, digi3] ] ] to?
```

If this happens the person you called is already using the pad on a call with someone else. Try again later.

> You get disconnected ("kicked off")

The person at the other end had CONOK off, was busy, disconnected on his own accord, or the attempt to call failed by retrying out. You'll get kicked off anytime a pad call goes down.

It's 10PM, do you know where your vaporware is?

The local digipeater (N2WX-7 aka MLB) is now also a network node. I am not sure if it is the first instance of ax.25 13 AND the stuff to do the pad functions for folks unlucky enough not to have a TNC 2, but I include the example below of a short session with the Orlando mailbox using the PAD.

Actual unretouched example of the WORKING ON THE AIR pad:

```
:\
cmd:c n2wx-7
cmd:*** CONNECTED to N2WX-7
{4
gator 2 pad 03100305724 port A

enter: call [,digi1 [,digi2 [,digi3] ] ] to?k4aho orl
*** pad: connection reset
K4AHO Packet BBS, Orlando, FL, new msg's 1126
to 1125
Type X for long menu, H for Help
Last Msg 1125, 59 Active Msgs
(B,D,G,H,I,J,L,R,S,T,U,W,X) >
Oh, Hello Howie
Last Msg 1125, 59 Active Msgs
(B,D,G,H,I,J,L,R,S,T,U,W,X) >
b
*** DISCONNECTED
N2WX-7>K4AHO,ORL <UA>
N2WX-7>N2WX-1 <D>
```

Using the Ic-27/37/47 on Packet

Andy Demartini, KC2FF

ICOM makes a line of compact, medium power VHF transcievers called the IC-27/37/47. These units are fully-solid state synthesized quite compact at 1 1/2 H x 7" W x 7" D use pin-diode antenna switching and run on 12 vdc. These radios make very nice RF units for packet radio applications. Their size and power needs have made them almost ideal for the KC2FF-7 digipeater. There is an IC27-H (45 Watts out) on 145.01 and an IC37-A (25 Watts) on 221.74. At home, the RLI MailBox station is an IC27-A which puts out 25 watts. I haven't used the 450 mhz unit on packet, but it should be just as good as the others.

Along the way, I looked into connecting into the ICOMs in a manner that would permit me to get clean audio close to the discriminator. This is desireable if one wants the best possible sensitivity, since the later amplification stages tend to alter the tone balance. Another goal was to be able to get unsquelched audio without noise constantly coming from the speaker. This is advantageous in that it eliminates squelch-open time, which can chop off the beginning of an otherwise readable packet. Lastly, I wanted to be able to hear the channel action easily, to facilitate problem diagnosis.

All these features are achieved by unsoldering one wire and adding a jumper. ICOM's microphone connector has all the signals you would normally need: audio in, keying, ground and speaker-out. The modifications below will get you the low level, clean audio that TNCs really like.

Step 1: Remove the top and bottom covers. Be careful with the speaker wires ! They unplug easily, but can be damaged by rough handling.

Step 2: Remove the four screws that hold the front panel to the frame. This will give you easy access to the mic connector backside.

Step 3: Locate and unsolder the wire going to mic pin 8. This is the speaker line. Tape it and dress it along the frame. It will not be re-connected.

Step 4: Locate the purple wire which runs from pin 3 of J2 on the main circuit board to the terminal strip on the back of the squelch-volume control. This is low-impedance audio from an emitter-follower to the high side of the volume control. This audio has a constant level adequate to drive most TNCs.

Step 5: Install a jumper from the volume control high side to pin 8 on the mic connector.

Step 6: Re-attach the front panel to the frame, re-connect the speaker and close the cabinet.

You now have clean audio at the mic jack, and can use a single, multi-conductor wire to connect all required lines to the TNC. Since TNC audio was tapped before the volume control, you can turn the volume off, up or down, without affecting the TNC. You can also leave the squelch open without all that annoying background noise. And last, you can enjoy packet with a fine, silent rig to your heart's content.

The following message is from Digital Radio Net (DRNET) on the NJ Institute of Technology Electronic Information Exchange System (EIES).

M 3383 Pete Eaton (WB9FLW,2970) 1/18/86
10:58 PM L:11
KEYS:/FCC APPROVES NEW DIGITAL PRIVILEGES!/
To: All
Subject: FCC Approves New Digital Privileges

Part 97 of the FCC Rules & Regulations have been amended to allow unattended automatic control of Amateur Digital Communications above 50 MHZ. PR Docket 85.105 was approved by the Commission on Tuesday, January 14th. It will allow digipeating and other Amateur Digital Repeating Devices to operate unattended.

The following electronic mail (DRNET) message is published for the information of all PRM readers.

M 1221 ANDY FREEBORN (NOCCZ,2983) 1/13/86
7:41 AM L:16
KEYS:/RMPRA SUBSCRIBES TO PACKET RADIO MAG/
TO: W1BEL, WB9FLW, WA7GXD, NOCCZ

Gwyn,
Yesterday (Sun 12 Jan) the RMPRA BOD approved a plan which provides that the FADCA>BEACON/ Packet Radio Magazine will become the official newsletter for the organization.

RMPRA editor is Sam Selders, WOHJX, 1626 27th Street, Greely CO, 80631. Tel:(303) 352-9159. HF packet: @ WA0SGQ, or thru me via this medium.

The complete implementation of the program to all members will be phased in over a period of a couple of months. The initial roster (labels), which will be small, will be forwarded within 10 days-2 weeks.

Mississippi Amateur Radio Digital Association

Patrick J. Fagan, WA5DVV
2412 E. Birch Dr.
Gulfport, MS 39503
(Compuserve ID: 74246,1310)

Happy New Year from the Magnolia State everyone! 1985 brought with it an upsurge in Packet Radio activity. We watched this digital mode grow from two or three active stations to well over seventy at the last unofficial count. Of course, some of these PACKETEERS have QTHs in southeast Louisiana and southwest Alabama. Most of the packet populous can be found along the Gulf Coast at present, but a change is in the wind. As our network grows interest is spreading throughout the state. I will attempt to keep you up-to-date each month on Packet Progress in Mississippi. Please send news about activities in your LAN to the address at the beginning of this column.

One of the biggest problems we face in our state is the lack of a good digipeater network. Currently, I know of only three DIGIs in Mississippi. GPT (WA5DVV/R) on the coast in Gulfport, KC5RY-1 in Columbus and WD5IKD in Pearl (Jackson). Alan, WD5IKD leaves his personal TNC on as a DIGI with the antenna beamed toward the coast. Under normal conditions these DIGIs cannot hear one another. Although packet QSOs are abundant along the coast from Louisiana to Alabama and even into Northwest Florida, they are practically non-existent from the coast to the north. So we find a situation whereby a handful of stations are communicating within their LAN but cannot make a connect outside unless some unusual propagation knocks on their door.

HATTIESBURG LAN

Groups throughout the state are currently working on DIGI plans and Hattiesburg could very well be the next site. MARDA members traveled to that HUB CITY recently to put on a digital demo. The presentation was given at the Red Cross building where a Ringo Ranger at 40 feet was the only antenna available. Since the nearest packet station and WORLI MailBox was over 65 miles away, we had a problem. In order for this demo to work a connect to the GPT Digi in Gulfport was mandatory. Neil, N5GRW allowed us to use his QTH (two miles from the Red Cross building) as the site for a temporary DIGI. I was told the Neil had, what was believed to be, an adequate antenna system to hit the Digi in Gulfport. We arrived after dark so a view of the SKYHOOK was not possible. Still not completely convinced that we could

'make the trip', the Model 100 was turned on and there was GPT sending out packets to Hattiesburg at 60/S-9. After the shouting and yelling stopped (hoo-rays, etc.) and everyone regained their composure, a closer look at the antenna system was in order. A 120 foot tower and two stacked 11-element beams proved to make for an 'adequate' antenna system (I'll say!!!). I am happy to report the demo was a complete success. As this column is being written there are rumors circulating that Santa left a couple of TNCs in this area. Digital signals are emanating from north of the coast now. Next month we hope to identify the source of this 'Packet Racket' and a full report will be made.

JACKSON LAN

WD5IKD in Pearl reports that a new site for a permanent DIGI is being sought. As mentioned earlier in this column, Alan leaves his TNC on 24 hours a day for digi use. This works fine as long as Alan is in town. But when he goes off so goes the digi. He has connected as far north as WD5EED in Hernando (south of Memphis) and into the New Orleans and Mobile area via GPT on the coast. Plans are also in the works for a WD5IKD PBBS in the very near future. The software for this new system is currently being tested. Alan is the Mississippi area rep for AMSAT. Look for updates on the progress of PACSAT here as WD5IKD gets the skinny. Other stations on packet include N5III in Brandon with a PK-64 and NC5Y in Jackson with an HD-4040.

COLUMBUS LAN

Jorge, KC5RY reports a bevy of new activity in the Columbus area. Their DIGI has been on for about four months and the interest is growing. Connect via KC5RY-1 when routing traffic into this vicinity.

VICKSBURG LAN

Bill, WB5SXK says that he will be using the software approach to get his packet station on the air. The program was written by Bob Richardson, W4UCH and is running on his TRS80 Model 1. By using this technique the only external equipment required, other than the TRS80 Model I, III or IV (III mode), amateur VHF xcvr, and antenna is a port zero encoder/decoder and two EXAR chips (or 1200/2200 modem) for AFSK keying and demodulation. A DIGI using a GLB TNC is also in the works. W4MKS has a new PK-64 so look for some new activity from Vicksburg 'real soon now'

Continued on page 18.

UPRA Connect

Newsletter of the UTAH PACKET RADIO ASSOCIATION.

UPRA: A SHORT STORY

Barely little more than a year ago, Packet activity in Utah consisted of two stations; myself and Scott WA7UZO. A few other people were showing an interest, but none had taken the plunge. Furthermore, the dismal growth was projected to continue for a while to come.

The concept of a limited interest club dedicated to Packet Radio was first mentioned in about October, 1984. As we approached our first tentative meeting, activity had increased to four stations.

At the first meeting, held on January 3, 1985, at which was shown the introductory videotape starring Pete Eaton, we had an attendance of about 20. UPRA was formed that same day, with the appointment of a Board of Trustees, and the election of officers.

The main purposes of founding UPRA was to boost Packet activity through a massive publicity campaign, which consisted of a high-visibility approach to the Northern Utah ham community, followed by meetings and newsletters geared to informing the new aficionados of what they had gotten into. Furthermore, UPRA was to provide a united front to other ham groups when trying to carve out a little niche for our new mode of communications.

In the above aspects, UPRA has been a resounding success. In the last twelve months, the number of Packet equipped hams has grown from four to 56, and may pass 60 before UPRA's first anniversary rolls around on January 3, which would make an annual growth for 1985 of 1500 % .

Let's look at a few of the reasons for this phenomenal growth in Utah. This same situation exists across the world, and the same growth has been experienced in many places.

1. Education. UPRA has sponsored several lecture meetings, in Salt Lake, Boise, and the WIMU hamfest. Plans for next year include three talks early in the year on the Wasatch front (the first being our at our January meeting), as well as Vernal and WIMU. This group education was coupled with one-on-one demonstrations to friends, as well as a plethora of articles in the ham radio press.

2. Timing. Ham radio was, and is, ready for an error-free computer data transfer system.

3. Cost. A year ago, an assembled and tested TNC sold for between \$225 and \$500, and a kit for about \$250. Now you can procure a kit for \$120, and an assembled unit for about \$150 (and going down).

4. Availability. Several new TNCs are now appearing on the market, most notably the AEA PK-64 Packratt. This TNC plugs into the back of a Commodore-64, and includes all the necessary software in ROM. Most of the other TNCs are clones of one of the two TAPR designs.

UPRA has several new goals for 1986, the most important being the implementation of links to surrounding areas. The three directions which we pursue initially are to Boise, Idaho, Denver, Colorado, and California. Networking hardware is tentatively in our plans, as is higher speed packeting.

I, as President and Newsletter Editor, am very pleased to be part of Packet Radio Magazine, and UPRA members are eager for news from around the country.

Dave Pedersen N7BHC
UPRA DATA

MEETINGS: Held at the Heathkit store, at 7200 South State (58E.), on the second Thursday evening of the month at 7.30 p.m. At the next gathering, on February 13, we will have a talk by Bill Gillman, WB7RFS, on the ISO layer system of separating the various levels of functions in a packet network.

VOICE NET: The information dissemination and question/answer voice net is held on Tuesday evenings at 8.45 p.m. , on the 146.02/62 repeater. The time may be changed to 9.00 p.m. in the near future. Net control is Steve KI7L.

PBBS: The Salt Lake area Bulletin Board Service operated on 145.01 MHz. Callsign is WA7UZO; Scott is the sysop.

MEMBERSHIP: It costs \$15 per year. Additional family members sharing a newsletter pay only \$1.00.

ADDRESS: Utah Packet Radio Association
4382 Cherryview Drive
West Valley City, Utah 84120

PHONE # : (801) 967-5896 (evenings and weekends - ask for Dave)

FADCA > BEACON

THE FLORIDA AMATEUR DIGITAL COMMUNICATIONS ASSOCIATION

FADCA Packet Frequency Coordinating Committee

Tom Kneisel, K4GFG

The Florida Repeater Council delegated the authority to coordinate our two meter packet frequencies to FADCA. The FADCA Board of Directors is setting up this committee to perform that function. The first formal meeting of the group was held in Sebring at 10:30 AM on January 12, 1986. In attendance were members K4NTA, K4AHO, KB4CIA, WB4KGY, and K4GFG. From the FADCA Board of Directors was W1BEL. A resignation from W4DPH was tendered and accepted. K4NTA resigned as chairman, and KB4CIA was elected to that position. K4GFG was designated Secretary.

K4AHO introduced discussion towards modifying the charter and makeup of the PFCC. He proposed to expand its function to give more support and direction to LANs. The LAN boundaries would be determined, and representatives from the LANs, Digipeater owners, and BBS operators become members of a Network Coordinating Committee. The committee would set rules for networking, location of mailboxes and general operating rules. Jim argued that the need to coordinate LANs outweighs the need to coordinate digipeaters at this time. K4GFG pointed out that the Naples and Sebring type meetings are being held for that purpose. After more discussion, the PFCC then recommended to limit its charter more to the frequency coordination tasks as delegated by FRC and FADCA.

Next some operating rules were established. Policy will be determined by a majority vote of members, with an implementation date to be set nominally 90 days thereafter. The proposed policy will be published in the FADCA>BEACON (Packet Radio Magazine) for two monthly issues running, in order to allow feedback from the packet community. Unless another vote changes the policy due to feedback or ideas received, it will become final on the designated date and notice given in the next issue of the BEACON.

KB4CIA has drawn up a digipeater registration form, and it will be reviewed by the PFCC members before the next meeting.

Discussion turned to details of digipeater coordination. K4GFG pointed out that five frequencies on two meters were insufficient to provide the FRC standard of 85 miles co-channel protection of repeaters. This assumes that the existing digipeaters wish to remain on two meters and receive their own LAN frequencies. The PFCC noted that the Packet Radio in Southern Michigan Spectrum Planning Committee has designated frequencies in the 144.9 - 145.1 range for packet operation. The PFCC decided that additional frequencies on two meters in the 144.9 - 145.0 range will be requested from FRC when it becomes appropriate. PFCC also wishes to encourage packeteers to use bands other than 144 Mhz for LANs, and link them together on the common 220 Mhz auxiliary link.

K4GFG had done some preliminary investigation into optimum digipeater spacing and frequency assignment, and will continue to work on that issue and report at the next PFCC meeting.

The PFCC meetings are open to all who wish to attend. The next meeting will be at the Miami Hamfest at 1 PM Saturday in Meeting Room 3. There will also be a PFCC meeting at the Orlando Hamfest at 1 PM on Saturday, in the Southnet Room.

Packeteers are encouraged to contact their nearest PFCC member to express their views, or to write to PFCC at the FADCA address in Brandon, Florida.

The FADCA SOFTWARE LIBRARY

The FADCA software library is operated by Howard Fisher, N4KPU. The library specializes in public domain software oriented to the amateur using digital communication methods. When in full operation, the library will provide a full suite of Xerox 820 software, CPM and MSDOS development tools and terminal programs etc. There will be limited support for Commodore 64 and other popular computers, also.

Please send your software contribution to Howie at the address below. Provide whatever documentation you can on the diskette and include your name and address as well.

Howard Fisher, N4KPU
3191 Willow Rd.
Wimauma, FL 33598

FLORIDA DIGITAL EVENTS

FEB 8/9 Tropical Hamboree (Miami Hamfest) at Dade County Youth Fair Grounds in Tamiami Park. Packet radio manufacturers forum. FADCA Packet Frequency Coordinating Committee meeting at 1 PM Saturday, Meeting room 3.

FEB 22 Stuart Outdoor FREE FEST, Langford Park, Jensen Beach. Talk-in 147.06 (-600). Contact K8BXT (305) 286-4782 or KI4NF (305) 878-1784.

MAR 1 City of Palms Hamfest, Ft. Myers. Talk-in 146.28/88. Contact Earl, K4FQU, (813) 332-1503.

MAR 1 Hernando County Hamfest in Brooksville. Talk-in 146.115/715.

MAR 7/8/9 Orlando Hamcation. SOUTHNET-III Packetfest (Fri and Sat) in conjunction with the 5th ARRL Computer Networking Conference (Sun). FADCA Packet Frequency Coordinating Committee meeting at 1 PM Saturday in the SOUTHNET room. **Workers needed**. Contact Gwyn, W1BEL, (813) 689-3355.

MAR 15-16 No. Florida Swapfest, Ft. Walton Beach. Contact Hud, KF4BU, (904) 862-2566.

Junkbox

For Sale: Complete working Xerox 820-1 Computer System in beautiful cabinet: \$495. New 820-1 parts: Board, Pwr Sup, Keyboard: \$195, Two Emerald DSDD disk controller kits for Xeros 820-1: \$75 each, Digital Research of Texas terminal board - new: \$75, Motorola 12" green screen monitor with 120 vac pwr: \$50, B/W 12" monitor (12v): 410, Kenwood TS-130s, PS30A, Hustler antenna system: \$495.

Bill Sams, 109 Windy Circle, Brandon, FL 33511. (813) 689-8291.

For Sale: Hitachi V-202 Scope, \$300, Heath digital frequency counter IM-2420, \$180, Nye Viking MB II Transmatch, \$150. Marty Schreiber, (813) 681-3513.

For Sale: One AEA PKT-1 \$115, DEC LA-34, \$150, Kenwood SP-430, \$25. Phil LaMarche, Day: (813) 576-1966, Evening: (813) 963-1132.

For Sale: 1 VHF lo band Mobile, 7 VHF hi band mobiles, 3 UHF mobiles, 2 base stations, 1 base station on 2 meters, 300 w in a 6 ft rack.

Don Deem, KB4LLO. 4811 29th Ave Dr W., Bradenton, FL 33529. (813) 792-1853.

FOR SALE: Complete WORLI PBBS system, consisting of a Factory assembled XEROX 820, which has two 5" SSSD drives, and can include a TNC if required. This unit is being sold to help pay for an IBM-XT clone BBS system. Contact Scott Bidstrup WA7UZO at (801) 263-0519 (weekdays) or (801) 264-8121 (weekends and evenings)

FADCA is a non-profit Florida corporation devoted to research, development, education, and public service.

Directors

Jack Brindle, WA4FIB	Andy DeMartini, KC2FF
Jim Diggs, K4AHO	Howard Goldstein, N2WX
Ted Huf, K4NTA	Dick Klein, W4PCM
Gwyn Reedy, W1BEL	Bill Whitaker, WD4JKM

Officers

President - Gwyn Reedy, W1BEL
Executive Vice President - Ted Huf, K4NTA
Secretary - Don Deem, KB4LLO
Treasurer - W. Stephen Rice, K8SR

FADCA dues for 1986 are \$15. Members receive PACKET RADIO MAGAZINE monthly.

Reprints of back issues of the FADCA>BEACON are available for copying and mailing costs of \$1.00 per issue, or \$8.00 for an entire year (84 or 85). Both year's issues may be obtained for \$15. Send your request to FADCA, 812 Childers Loop, Brandon, FL 33511.

FADCA VOICE NETS

REGIONAL (FLORIDA AND ADJOINING STATES):

3958 KHz Sunday 8 AM EST. NCS: K4NTA. We are looking for a NCS in far north Florida or Georgia to conduct a session one hour later at 8 AM CST.

SOUTHNET COORDINATION NET: 7190 KHz each Sunday at 2 PM. NCS: W4FX.

BREVARD COUNTY AREA: 146.940 (-600) Sunday 8 PM (Space Shuttle audio has priority)

BROWARD COUNTY AREA: 147.00 (-600) Sunday 8 PM. NCS: K4GFG, N4KWB

CRESTVIEW (Panhandle): 147.360 (+600) Sunday 8:30 PM (after traffic net). NCS: K3NN

GAINESVILLE: 146.91 (-600) Monday 8PM.

MARION COUNTY AREA: 146.61 (-600) Thursday 0045Z. NCS: K4OZS

MIAMI: 147.000

SOUTHWEST FLA: 146.73 (-600) (Sarasota rpt) Wednesday following SERA net at 7:30 PM.

STUART: 147.060 (-600) Sunday 8 PM.

TAMPA BAY AREA: 147.165 (+600) Sunday 7:30 PM EST. NCS: KB4LLO.

WEST PALM BEACH CO: 147.285 (+600) Monday 8 PM

FADCA MEMBERSHIP CONTEST

The FADCA membership contest will end on January 31, 1986. The results will be announced in the February FADCA>BEACON section of PRM.

Notice: Anyone running a TNC-1 or clone as a digipeater should switch over to WA8DED software right away to insure proper handling of the Poll/Final Bit in digipeated frames.

3036 Parkwood Road
Sebring, FL 33870
January 17, 1986

Dear Gwyn,

I have some good news from Sebring. We have a Digipeat sight. It has 110 power, an 80 ft. tower (possible 150) in the future and the site is manned 24 hours a day.

Unfortunately we don't yet have the whereabouts to get the equipment and everything we need to get set up. Our group the Sebring Repeater Group is relatively small, about 15 members, and although we are working on it we haven't reached the point yet where we can jump out there financially and buy everything we need.

With this in mind, I wonder if you would consider mentioning it in your travels that we are in need of assistance and can use all the help we can get. Also recommendations on which way we should go for a TNC. In order to get operational, we need to get a rig, antenna, feedline and TNC. We are working on these items and eventually we will get everything but if we can get any help in any area, we would appreciate it.

73, Clay -- W1PI
Treasurer, SRG

FADCA has 8530-A SCC chips which are used on the FADboard with the Xerox 820 to give a dual HDLC output. These are high speed 6 MHz parts. Only \$20.00 postpaid.

The FADCA modem kit provides a good quality, inexpensive way to get on HF packet, or to provide a modem for your FAD board or state machine on the Xerox 820. The price is \$8.95 postpaid from the designer and producer:

Jerry Quimby (N4AJH)
601 Verbenia Drive
Satellite Beach, FL 32937

FADCA badges are now available. Badges are 2 1/4" round with locking pin on backside. \$1.00 without call letters, \$2.00 with. Colors available are yellow, gold, salmon and blue. Write Brad Voss, WB8ZPE, 625 Cedar Grove Drive, Brandon, FL 33511.

FOR SALE: ZORBA portable CP/M computer. 64k memory, Green screen, dual 5 1/4" drives, much software. \$550. Brad Voss, WB8ZPE, 625 Cedar Grove Dr., Brandon, FL 33511.

Nibbles and Bits

C2974 CC162 Lyle Johnson (WA7GXD, 2973)
1/12/86 7:14 PM L:40 (DRNET)
KEYS:/NNC MODEM TESTING PROGRESS/

To: All
Fm: TAPR
Re: NNC Testing Update

Today, 12 January 1986, the prototype NNC Modem Board has undergone initial testing. This board contains four (4) XR2206/XR2211 modems, a crystal-controlled baud rate generator, four (4) state machines for NRZ <--> NRZI conversion and a tuning indicator.

As might be expected in an initial prototype, there are a few errors in the PC board layout. After correcting these errors, the following emerged:

- 1) All XR2211 demodulators work. The residual noise at the inputs to these chips is on the order of 2 or 3 millivolts. With an input signal of under 20 mV they lock solidly.
- 2) The baud rate generator works fine. It is based on a 4.9152 MHz crystal oscillator. All output leads are bypassed with a series 100 ohm resistor and small capacitor to ground (L network).
- 3) All XR2206 modulators work.
- 4) All state machines work, clock recovery is solid with a signal of 20 mV to the associated XR2211.
- 5) The tuning indicator portion was not tested.

In light of the reported difficulties with TNC 2 oscillator RFI, the modem board was tested with a Kenwood TR2600A HT (includes S-meter). Unless the capacitive end of the antenna was physically positioned less than 1/4" from the PC board, it was impossible to hear any spurious signals from the board. This is with squelch open.

Thus, the initial state of the Modem board for the NNC is favorable, with RFI very low and modem sensitivity very high. Further testing will be conducted in the near future and reported here.

The above testing was conducted by Eric Gustafson, N7CL, designer of the modem board.

M 21003 Skip Hansen (WB6YMH,2964) 12/ 8/85

1:52 PM L:15 (DRNET)

KEYS:/NNC SCSI HARD DISK CONTROLLER/

To: Potential NNC software developers

Subject: Mass storage for NNC software development

My company has a limited number of SCSI bus hard disk controllers available for ST-506 style hard disk drives. The controllers are DTC-510B's which are surplus to our needs, but are new. The price is \$60. There are several companies offering good deals on 10 Mb hard disk drives which would allow a 10 Mb hard disk to be interfaced to the NNC for around the cost of two floppies. I have written a CP/M 2.2 BIOS which supports a Segate ST-412 with this controller and would be happy to make available. If anyone is interested let me know. If nothing else it's a hell of a good way to make sure the SCSI port gets a good thrashing!

73's Skip WB6YMH

From Compuserve Hamnet 18-Jan-86 01:15:23

Sb: WORLI SYSOP Documentation

Fm: Jon Pearce, WB2MNF 70206,421

To: Packet People

Wes Morris, K7PYK has graciously offered to take over the distribution of the WORLI SYSOP doc, although I'll continue to write it. If you're setting up a BBS and want a copy, give Wes a call at (602) 946-8356 to find out about availability. I just sent him a disk of the doc for Version 1.06, so he should have that available shortly. The postage is now \$2.40 for the 75 page document, and he'll probably have to pay for copying so be prepared to pay about \$6 or \$7 just to cover his cost. (If there's anyone out there who has access to free high-volume copying and would like to volunteer I'm sure that Wes would be glad to hear from you.) There were also a number of requests for the doc which I had accumulated over the last month while I was updating it. Wes has them too, so if you asked for a copy and didn't get it, it should be out soon. Hank just released 11.1, so I'm back at the keyboard again!!

Continued from page 13.

GULF COAST LAN

Here on the coast Packet Radio is really thriving. The first stations went on the air over a year and a half ago. Walt, WA5MPI in Gautier and Walt II, WA5MPH in Bay St. Louis were the pioneers on this mode in Mississippi. I remember seeing their TAPR 1 boards long before the general amateur community ever heard the word TNC. Then Mike, KB4JHU in Grand Bay, AL (about 15 miles from the Mississippi state line) got involved. At this point we actually had three stations that could QSO when conditions warranted. WA5MPH lives near the MS/LA border and WA5MPI about 10 miles from the MS/AL line. The path was too long for reliable packet communications. At this time I was very active on RTTY and wasn't too excited about getting involved with another digital mode of operation. But Walt's I and II kept saying how nice it would be if a DIGI could be built in the center of the Mississippi coast line. So if you can't beat 'em --- join 'em. I was formally introduced to Packet Radio and the excitement started to mount.

After a few more people expressed interest, MARDA was formed to fund a Digi, get a WORLI MailBox on the air and spread the word about packet throughout the state. Both systems are up and running with over 81 users connecting thus far. GPT in Gulfport hears SLI in Slidell, LA (near New Orleans) to the west allowing connects on a regular basis to as far as Beaux Bridge, LA (near Lafayette). Looking eastward, QSOs are commonplace into the Mobile/Pensacola area. This path will improve substantially when MOB (Mobile Digi) comes up. If all goes well, MOB will be on by the time you read this.

These active stations are looking for connects:
Bay St. Louis ---

WA5MPH, K5GY

Biloxi -----

W5IBO, K4JHE, KB5FC

Gautier -----

WA5MPI, KE5SJ

Gulfport -----

W5PDG, WA5DVV (MailBox), WA5SUE,
WB8BIE, WA4TWE, KA4CRT, KA5HOP,
N5HGU, *** GPT ***

Pascagoula -----

W5BDS

Until next month, may all your CONNECTS be many and RETRIES few. >

***NEW ***

PAK-COMM

*** NEW***

The PAK-COMM program is written for packet radio terminal controllers. The program enables the operator to enjoy the uses that packet radio offers by taking care of the housekeeping, and provides the little 'extras' that make daily operations easy. Use PAK-COMM for both modem and packet work.

Com Parameters: 300-9600 bps, set port, parity, data bits. A start-up file with pre-defined communication parameters, file transfer protocols, date/time stamp options, operator identification line and space for command macros. Set up many files, pick at run time.

Scrolling Pages: Five pages of receive screen with full cursor control.

Split Screens: Separate transmit and receive screens with full line buffering for the transmit. This will enable you to monitor all channel activity while composing messages. Set split where you wish.

File Transfers: You may use transparent or x-modem protocol. Constant character count is provided to monitor activity.

Command Macros: The Alt function keys are available to send strings of up to 250 characters or timing loops that are sent to the controller in one keystroke. Setup complex rpt chains or BBS logons.

Help Screens: Two individual help screens are available, one is a text file to be modified by the user. A good place for system maps.

And Lots More: Like 5 different date/time formats, operator identification line, log files, 50 page manual and even MORE !

NOT COPY PROTECTED

FOR IBM PC/XT/AT/jr(256k) or compatables

ONLY \$49.95 + \$3.00 (Shipping + Handling)

PERSONAL CHECKS AND MONEY ORDERS ONLY ORDERS SHIPPED NEXT DAY

KALT & ASSOCIATES
2440 E. TUDOR RD. SUITE #138
ANCHORAGE, AK 99507
(907) 248-0133

IBM Trademark of International Business Machines, Inc.

Plug-in TNC for PCs

Hamilton Area Packet Network introduces the
HAPN PC-PACKET ADAPTER

The HAPN adapter is unique in terms of its versatility and ease of operation. It is designed for the IBM PC and compatibles. The IBM PC or compatible is rapidly becoming a leader in the HAM-world due its attractive price and excellent performance.

The HAPN packet adapter is a card that plugs directly into one of the slots of the PC. It contains a built-in modem which interfaces to the radio with a DB9 connector. The card is 8.5 inches (22 cm) long and contains a prototype area. The software is powerful and is a delight to use. The transfer of ASCII or binary files is very simple by using the function keys on the keyboard. A popup menu allows you to set up the repeater routing table. Optional software is available for bulletin board operation. Experimental protocols such as VADCG V1 and V2 are also available.

Features of the H.A.P.N. packet adapter :

1. In addition to the American AX.25 protocol is also runs the Canadian experimental protocols V1, V2 as designed by Doug Lockhart (VE7APU) of the VADCG (Vancouver Amateur Digital Communications Group). (Doug is a world leader in modern packet radio since 1979 and founder of the VADCG.)
2. Excellent software. The software provided by HAPN is user friendly, easy to operate and very powerful. Available at present:
 - a. AX.25 host support (included)
 - b. bulletin board program PCRBBS (optional)
 - c. file transfer programs (optional)
 - d. experimental protocol support for VADCG V1, V2 (optional)
3. The HAPN adapter plugs into a PC, PC-XT, PC-AT or compatible. No external cabinet or power supply is required.
4. Simple to interface to your radio. It requires RX audio, TX audio and push-to-talk. The carrier detect (radio channel busy) is generated internally from the received data or optionally brought out from your squelch circuit.
5. The built-in modem is Bell 202 compatible. It uses the XR2206 and XR2211 chipset. The tones are 1200 and 2200hz. The data rate is 1200 baud. A hardware watchdog circuit prevents possible TX runaway problems as a result of power glitches or lightning.

NOTE: The baudrate for the adapter is selectable by jumper from 75 baud to 9600 baud. (The on-board modem supports up to 1200 baud.)

6. The board contains a prototyping area for personal use. The area is pre-drilled.
7. The adapter is based on the INTEL 8273 HDLC/SDLC protocol controller chip with a straightforward interface to the PC.
8. The low level software (device driver) is interrupt driven and stays resident in the PC allowing the adapter to function in the background. An application program such as bulletin board, file transfer or terminal program does not have to be resident for the adapter to function. In this mode, the user is alerted to a caller by a connect alarm utilizing the PC's speaker.
9. Easy customizing for the user. The user configuration such as callsign/SSID, auto logging of packet activity to disk, default repeater, connect alarm etc. are set up using the configuration screen and remembered by the program. These options can be changed at any time.

10. NOTE FOR PROGRAMMERS

Since the adapter uses the native code of the host computer no cross compilers are needed for anyone wanting to develop his own code.

ORDERING INFORMATION AND PRICE :

All prices are in US\$ and include postage and handling in USA or Canada. Please add 3\$ for overseas orders.

1. Assembled and tested board with AX.25 host software and self-test program (4 programs and documentation)	\$199.00
2. Bare board with AX.25 software and construction details	\$ 75.00
3. AX.25 software only	\$ 40.00
4. Bulletin board & file transfer programs	\$ 25.00
5. Advanced VADCG experimental software	\$ 25.00

Make checks and money orders payable to H.A.P.N. The address is :

HAPN
Box 4466, Station D,
Hamilton, Ontario,
Canada, L8V4S7



ORLANDO HAMCATION and COMPUTER SHOW



EXPO—CENTRE

500 WEST LIVINGSTON

FLORIDA STATE ARRL CONVENTION

MARCH 7, 8, 9, 1986

5:00 p.m. - 9:00 p.m. Friday (SWAP ONLY)

9:00 a.m. - 5:00 p.m. Saturday

9:00 a.m. - 2:00 p.m. Sunday

- Over 160 commercial booths representing the major manufacturers and dealers of Amateur Radio and Computer Equipment.
- Programs, forums and discussions held on all aspects of Amateur Radio and Personal Computers.
- HUGE indoor Swap Shop with over 600 Tables.
- Convenient Parking

VOLUNTEER EXAMINATIONS by C.A.V.E. V.E.C., SUNDAY, MARCH 9. Send Completed Form 610 and Photocopy of present license, \$4.00 fee to R.V. Mackey, C.V.E., P.O. Box 1598, Maitland, FL 32751 (Walk-ins accepted)

Free Parking Available Also for R.V. and Charter Buses

AL HUBER, KC4CT HAMCATION CHAIRMAN

P.O. Box 15142 • Orlando, Florida 32858 • (305) 422-ARRL

Pre-Registration

Prize:

Bird Wattmeter

**The Pre-Registration Drawing
will be at
10:00 A.M.**

**SUNDAY, MARCH 9
You do not have to be
present to WIN!**

PRE—REGISTRATION FORM

**Orlando Hamcation and Computer Show
P.O. Box 15142, Orlando, FL 32858**

**I would like to Pre-Register for the Orlando
Hamcation, March 7-9**

Enclosed is my check for:

Hamfest Tickets @ \$5.00 ea. \$

Swap Show Tables @ \$20.00 ea. (3 Days) \$

(eight foot tables) Total \$

NAME _____ HAM CALL _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Monies must be received in Orlando no later than March 1st.

Self addressed stamped envelope required.

Children under 12 Free with Paid Admission

TOO GOOD TO BE TRUE?



PAKRATT™ Model PK-64

shown with enhanced
HFM-64 option installed

★ MORSE ★ BAUDOT ★ ASCII ★ AMTOR ★ PACKET ★

FIRST FIVE MODE DATA CONTROLLER

The Pakratt model PK-64 by AEA is the world's first computer interface that offers Morse, Baudot, ASCII, AMTOR and Packet all in one box (hardware and software included) at a price many competitors charge for Packet alone (from \$219.95 Amateur net). Do not let the low price fool you; coming from any other company but AEA it WOULD be too good to be true. The PK-64 works with virtually any voice transceiver. The Pakratt is the easiest of any to hook up and have operating in just a few minutes.

In Packet mode, the PK-64 offers virtually all the features of every other Packet controller on the market, plus many important features left out by others due to cost constraints. For example, we have included a hardware HDLC, true Data Carrier Detect (DCD), multiple connect with up to ten stations simultaneously and full implementation of version 2.0 of the AX.25 protocol.

Because the PK-64 was designed specifically for the Commodore 64 (or C-128 and SX-64) computer, we have been able to do many things not economically feasible with general RS-232 interface controllers. For ex-

ample, the Pakratt includes true split screen operation with on-screen status indicators and an on-screen tuning indicator.

ENHANCED HFM-64 MODEM OPTION

The standard PK-64 will operate all modes with a phase-lock-loop (PLL) detector roughly equivalent to all popular packet modems in the marketplace (except we have included extra filtering). The enhanced HFM-64 modem option offers true independent dual channel filtering with A.M. detection (like the famous CP-100 Computer Patch™). The enhanced HFM-64 option also offers a hardware LED tuning indicator (like the CP-100) and a front panel variable threshold control for setting maximum sensitivity under various band conditions. We recommend the HFM-64 option for anyone keenly interested in weak-signal heavy-QRM HF operation. For anyone desiring to operate FM RTTY with the standard North American tone pair or CW receive, the HFM-64 is required. The HFM-64 is field installable with no soldering or test equipment required.

WORKS WITH THE POPULAR C-64 COMPUTER

AEA designed the PK-64 around the

low-cost C-64 because of the special architecture features making it especially suited to Amateur Radio applications. The C-64 should not be viewed as a mainframe, but rather a very economical accessory to your data communications system. Many owners of expensive computers such as IBM, TANDY, APPLE, KAYPRO, ATARI, etc., are now buying the low cost C-64 and dedicating it to their operating position. They simply cannot find software for their machine that even approaches the power and user friendliness of the PK-64. Plus, think of the convenience of having only one controller and keyboard to go from one mode to another without having to redo cabling!

The PK-64 is so complete that all you need to do is wire up a microphone connector to the end of a cable (provided) and you are ready to go. There is no need to track down special terminal software, cabling or even a power supply. It all comes with the PK-64. So do not be the last on your block to own the most exciting new product in years. See the PK-64 at your favorite dealer or write for our specification sheet now.

Prices And Specifications Subject To
Change Without Notice Or Obligation

Advanced Electronic Applications, Inc.
P.O. Box C-2160, Lynnwood, WA 98036-0918
(206) 775-7373 Telex 6972496 AEA INTL UW

AEA Brings you the
Breakthrough!